CLAIMS

1. A method for determining the relative position of a mobile in relation to the known position of a reference station, each using an antenna for receiving radio signals originating from an arrangement of positioning satellites transmitting on at least two frequencies L1 and L2, this method comprising the periodic determination, for each of said frequencies, of a set of 2p pseudo-ranges, i.e. p pseudo-ranges between the mobile and the p satellites and p pseudo-ranges between the reference station and the p satellites, the supply of the pseudo-ranges to a position-calculating unit, and the calculation by this unit of a relative position of the mobile in relation to the reference station based, on the one hand, on the pseudo-ranges and, on the other hand, on an estimated position Pe of the mobile in relation to the reference station, this method being mainly characterized in that, for a given set of 4p pseudo-ranges received by the calculating unit, the calculation of the relative position comprises the following steps which consist in:

- a) choosing a linear combination aL1+bL2 of said frequencies L1 and L2 from a predetermined list comprising at least two linear combinations of frequencies,
- b) calculating the linear combinations of pseudo-ranges corresponding to said linear combination, and, on the basis of these linear combinations of pseudo-ranges and the estimated position Pe, calculating a precise relative position Pp of the mobile in relation to the reference station,

-c) choosing from the list the following linear combination, if it exists, and, in this case, reiterating step b), considering the estimated position to be said precise position Pp, and using the same set of 4p pseudo-ranges to obtain an even more precise relative position,

-d) reiterating step c) for all the linear combinations in the list.

2. The method according to the preceding claim, characterized in that the linear combinations in the list are determined in such a way that, from one calculation to the next, the corresponding wavelengths reduce progressively and the sensitivity to ionospheric errors also reduces progressively.

3. The method according to any one of the preceding claims, characterized in that the first combination in the list is the combination L1-L2 (a=1, b=-1) and/or the last linear combination in the list is the combination 9L1-7L2 (a=9, b=-7), L1 and L2 being the transmission frequencies of the satellites of the GPS system.

4. The method according to the preceding claim, characterized in that the intermediate combinations are preferably as follows (in sequence):

2L1-L2 (a=2, b=-1); 3L1-2L2 (a=3, b=-2); 4L2-3L1 (a=4, b=-3).

5. The method according to any one of the preceding claims, characterized in that step b) comprises the following two steps, consisting in:

b1) calculating an approximate relative position Pa of the mobile in relation to the reference station on the basis of the chosen linear combination, Pe and a subset of 4p′ pseudo-ranges corresponding to p′ satellites, where p′ is less than p and where the p′ satellites chosen from the arrangement of p satellites are those which, taking into account the current geometry of the arrangement, are least sensitive to an error in the estimated position.

b2) calculating a precise relative position Pp of the mobile in relation to the reference station on the basis of said linear combination of Pa and the complete set of 4p pseudo-ranges.

6. The method according to the preceding claim, characterized in that the steps b1) and b2) are only carried out for the first linear combination in the list, a single step involving the 4p pseudo-ranges being carried out for the other linear combinations in the list.

7. The method according to any one of the preceding claims, characterized in that the 2p pseudo-ranges between the satellites and the reference station are determined by the reference station and sent by radio to the mobile which then

comprises reception means to receive these pseudo-ranges and information for dating the measurement of these pseudo-ranges.

8. A device for determining the position of a mobile in relation to a reference station, comprising at least, in the mobile, means for receiving satellite positioning signals and means for receiving a set of 2p pseudo-ranges transmitted by the reference station and representing the pseudo-ranges between the reference station and p satellites for at least two different carrier frequencies L1 and L2, means for periodic determination of a set of 2p pseudo-ranges between the mobile and the p satellites, means for supplying the 4p pseudo-ranges to a position-calculating unit (18), means for storing a list of linear combinations of the frequencies of the positioning signal carriers, means for carrying out, on the basis of the same set of 4p pseudo-ranges, successive calculations of the relative position of the mobile in relation to the position of the reference station, each time based on a different linear combination of frequencies chosen from the list, an estimated position Pe and the set of 4p pseudo-ranges, the position estimated in a calculation with a given linear combination from the list being the relative position calculated on the basis of the preceding linear combination from the list.